

2 ♀♀ from Dummer in Johar Valley, alt. 1680 m., Pithoragarh District, on 25 September 1967, skin and skull of one specimen preserved ; 4 ♂♂ and 4 ♀♀ (three adults and one juvenile) from Girgaon, alt. 1980 m., Pithoragarh District, on 27 September 1967, skins and skulls of one male and one female preserved ; 2 ♀♀ (juvenile) from Kapkot in Sarju Valley, alt. 1130 m., Almora District, on 30 September 1967 ; 1 ♂ from Dhakuri in Pindar Valley, alt. 2710 m., Almora District, on 2nd October 1967, skin and skull preserved ; 3 ♀♀ (one adult and two juvenile) from Khati in Pindar Valley, alt. 2290 m., Almora District, on 3 October 1967 ; and 1 ♂ and 3 ♀♀ from Loharkhet in Sarju Valley, alt. 1920 m., Almora District, on 10 October 1967.

It is interesting to note that the bat *Sphaerias blanfordi* was met with only in the interior valleys during the survey at elevations between 800 and 2710 metres while the other species of fruit bats namely *Cynopterus sphinx*, *Eonycteris spelaea* and *Rousettus leschenaulti* were collected from outer valleys and lower elevations. However, their populations were found mixed with *Sphaerias blanfordi* at elevations between 800 and 1000 metres between the Himalayan high ranges and the foot hills.

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2. SOME OBSERVATIONS ON THE GOLDEN LANGUR *PRESBYTIS GEEI* (MS. KHAJURIA) GEE

INTRODUCTION

The author and his wife stayed in the Manas Wild Life Sanctuary from 25 March to 13 April 1967 and during this time they spent six days observing a troupe of Golden Langurs *Presbytis geei* in the forest on the Bhutan side of the Manas River.

DESCRIPTION OF HABITAT

The jungle in this area falls within the type known as tropical moist deciduous (Champion 1938). The trees are high, up to 150 feet, and the canopy is almost closed, dominant species being deciduous. Climbers

are numerous and the shrub layer beneath the trees is dense in patches, elsewhere the forest floor is covered with fallen leaves which at this time of the year are dry and brittle. A feature of this type of forest is that the trees undergo a leafless period during the dry season at the end of which new leaves or flowers are produced in a sudden rush. Some trees burst into flower while still leafless especially *Erythrina*, *Salmaal* and *Cassia fistula*. The leafless period was just ending and many trees were in flower when the following observations were made.

HABITS

Size and composition of population

The study area consisted of a comparatively small part of the forest surrounding the Manas Bhutan camp and probably did not exceed one square mile. It was difficult to count the exact number of langurs living in the area due to the thickness of the overhead canopy in some places and the speed with which the monkeys made off when approached. It is known that there were not less than twenty nor more than thirty-five individuals present.

Sometimes virtually all the langurs in the area would congregate in certain trees where food was plentiful. However, such large groups were wary and when approached the langurs would dash off through the trees in several directions. There appeared to be two main groups of eleven and seven animals and these formed the basis of our observations.

Both groups were presided over by a dominant adult male and in the larger group some quarrelling was observed between the largest male and another almost as big. On one occasion during a fight the larger drove his opponent almost to ground level within a few feet of the observers.

Two adult females in the larger group each had a baby clinging to her body between her front legs, while one female in the smaller group was carrying a very young baby. The rest of the animals in both groups consisted of females without young, or sub-adults.

Breeding season

The largest of the three babies seen was still being carried by its mother though it would sometimes leave her and climb about on its own, even jumping small distances from bough to bough. Once it ran to the end of a bough and, faced with a long leap to the next tree, went through all the movements the langurs make when working up for a big jump. Grasping a branch on each side with their hands they rock backwards and forwards, finally launching themselves by pulling forwards with their arms while springing with their hind legs. Adults can cover enormous distances, in the region of 20 feet from tree to tree, although dropping

almost as far in the process. On this occasion the young langur decided the gap was too wide and ran back to its mother who jumped with it clinging beneath her body.

The youngest baby was still very small, it never left its mother and was quite easy to overlook when the female was climbing about in the trees. She spent much time grooming it, sitting in an upright position on a bough with the baby in her lap while she carefully combed its fur with her long fingers. At other times she would hold it to her breast to suckle. The age of this baby was estimated to be between one and two months and the breeding season of the Golden Langur would therefore seem to fall between December and February.

Feeding habits

The langurs were active from shortly after dawn throughout the hours of daylight but they invariably spent from 1½ to 2 hours resting during the heat of the day. Towards noon the group would congregate high up in a tall liana-draped tree, there they would sit huddled in the shade of the creeper. During their siesta they remained very still and were often well hidden; at this time they would allow the observers to walk beneath the tree and no amount of hand clapping, shouting, or hurling of small stones would make them move.

When they awoke the langurs dispersed amongst the trees and recommenced feeding until dusk when they settled down for the night, usually high up in a liana covered tree. According to the forest department staff they sometimes moved down to the river to drink during the afternoon, lapping the water or licking the rocks which in places are rich in minerals. This behaviour has been described by Gee (1964) but was not seen during the present study and may depend upon what other source of water is available to the langurs. At this season of the year they feed largely upon the succulent cherry-like buds and flowers of the 'Balu' tree, *Dillenia pentagyna*.

The langur's normal posture when feeding is to sit on a bough holding it firmly with one or both hind feet, its long tail hanging down and both hands free to pluck the leaves or flowers which are then transferred to its mouth, or a spray of foliage may be pulled down and eaten straight off the twig. When adopting the first method the langur often plucks a single petal most daintily. The animal is always careful to retain its grasp on a bough with its feet or hands.

During this study (25-31 March) the Golden Langur was seen to feed on the following :—

<i>Dillenia pentagyna</i>	.. buds and flowers
<i>Careya arborea</i>	.. " " "
<i>Bombax ceiba</i>	.. " " "

<i>Bauhinia vahlii</i>	.. leaves
An unidentified climber, possibly of the Legu- minosae	.. leaves

Mode of progression

When moving through the tree tops the langurs make use of horizontal boughs whenever possible, running along them on all fours or occasionally, when circumstances allow, running in an upright position but grabbing the vegetation on either side in their hands. In each case the long tail is used as an aid to balance. Their method of leaping from tree to tree has been described above. During its flying descent the animal adopts what is virtually a sitting position in the air with its feet and arms thrust out in front ready to seize the next bough and its long tail streaming out behind. At times such leaps are prodigious and quite often the animal only manages to grab the tip of a bough or hanging strand of creeper in one hand to dangle in space before getting a grip with its other hand. At such times it will travel short distances by brachiation but this is not its normal method of progression.

Members of a group almost invariably followed one another along an exact course when on the move, often queuing up to leap across a gap. If followed for a considerable time a group would become very strung out, the adult males and females carrying babies being left far behind by the nimbler sub-adults. Even under these conditions each individual followed the same route.

If suddenly alarmed a group dispersed in every direction but once the danger was over they reassembled. Such behaviour evidently has survival value in the event of an attack by a predator.

Once they became used to the presence of the observers the langurs would permit us to move about quietly beneath the trees without taking fright although they always showed signs of nervousness if we stood directly beneath them, then they would defecate and urinate. Since alarm would have caused them to flee it would seem that this behaviour was merely the result of nervousness though the accuracy at times might suggest that it was a conscious act on their part.

Voice

The most commonly heard utterance of the Golden Langur was a low-pitched, fast repeated *ur-ur-ur-ur-* usually made when quarrelling or mildly disputing food or right of way. This noise is of low intensity and not unlike the 'whickering' of the European Badger *Meles meles*. If suddenly alarmed the langurs uttered a harsh bark of anger, this was always a double note *agh-agh* repeated at intervals.

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3. BREEDING HABITS OF THE FIELD RAT *MILLARDIA MELTADA* (GRAY)

INTRODUCTION

Of the 91 species of rats and mice found in India, at least 25 occur in the Punjab (Deoras 1964). Among the field rats found around Ludhiana, *Millardia meltada* (Gray) is very common and comprised 50 per cent of the rats collected during September-November. It is abundant, and along with other species of rats, causes serious damage to important field crops like wheat, gram, sugarcane, groundnut etc. Previously, efforts to breed *Tatera indica*, another important species, in captivity for studies on its biology did not meet with success due to its cannibalistic habits (Singh 1961). Cannibalism was a problem in *M. meltada* also, but during the period of this study it was possible to reduce cannibalism to a low level in this species by giving special food; and the results of the study on its breeding habits in captivity are presented in this paper.

MATERIAL AND METHODS

Twenty new born young with their mothers were dug out from fields during March to May, 1965. These were kept in breeding cages measuring 45×30×22.5 cm. made of strong wire netting. The bottom of each cage was provided with a sliding metal tray for collecting faeces and urine. To provide darkness and privacy the cages were painted black.